PS234.

A Novel Secure Vessel Occluder for Minimally Invasive and Percutaneous Treatments

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Objectives: Secure vessel occlusion is critical to the success of all surgical and interventional procedures. This study tested both in vitro and in vivo, the Amsel Vessel Occluder (AVO), a novel occlusion clip device for secure blood vessel closure. The AVO, delivered through a fine (18-gauge) hypodermic needle, transfixes the targeted vessel, and delivers expandable proximal and distal elements on either side of the vessel wall, which lock together for secure vessel occlusion.

Methods: In vitro device testing was conducted on 5-mm silicon tubing. Standard corrosion analysis, material biocompatibility, and cytotoxicity were performed on the implantable elements. In vivo studies on three swine compared safety and efficacy of the AVO with the medium/large Ligaclip (J & J) for 1 week. The targeted vessels (carotid/femoral arteries; jugular/femoral veins) were divided between two AVO or two Ligaclips.

Results: In vitro testing (n = 11) confirmed a holding pressure of 450 mmHg (11 of 11), excellent clip closure repeatability (11 of 11), and release mechanism function (11 of 11). Once applied, the AVO was secure and could not be dislodged (none of 11). The Ligaclip was easily dislodged (11 of 11). No corrosion was observed, and material biocompatibility and cytoxicity (n = 12) were within accepted ranges. In vivo studies (six arteries; six veins) confirmed easy AVO application and superiority in security. The AVO showed no postoperative bleeding (AVO, zero of six), whereas one Ligaclip dislodged, resulting in a fatal hemorrhage 16 hours after surgery (Ligaclip, one of six).

Conclusions: The AVO is simple to deploy and securely maintains occlusion by transfixing the targeted vessel, unlike the widely used, nontransfixing Ligaclip that has a tendency to dislodge. As such, the Amsel secure vessel occluder opens up numerous treatment opportunities in both the venous and arterial systems to minimize open, laparoscopic, robotic surgical, and interventional procedures, and reduce patient morbidity.

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PS236.

Clinical and Pathological Assessment of Different Suture Techniques for Vascular Anastomosis in Rat Femoral Artery

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Objectives: The study design aimed to examine the differences in the clinical and pathologic features after vascular anastomoses of a rat femoral artery using four different suture techniques.

Methods: Sixty Sprage-Dawely rats were divided randomly into four groups. Fifteen bisected arteries (one from each animal) in groups I, II, III, and IV were sutured with the simple interrupted suture, continuous suture, sleeve suture, and cuff suture, respectively.

Results: The anastomosis times in groups I, II, III and IV were 28.67, 14.67, 15.47, and 15.93 minutes, respectively. Immediate bleeding that stopped without intervention (grade I) was observed in 67%, 73%, and 60% of the anastomosed vessels in groups II, III, and IV, respectively, whereas 60% of the vessels in group I showed light bleeding that was inhibited by gentile pressure (grade II). All vessels examined appeared to be patent at 5 and 15 minutes after the anastomosis. On the seventh day postoperatively, the vessels of group I showed the highest patency rate (93%) compared with groups II (67%), III (73%), and IV (87%). Moreover, there were more pronounced pathologic changes in group I than in the other groups. These changes included endothelial loss, endothelial proliferation, degeneration, and necrosis of the tunica media. Suture materials surrounded by an inflammatory reaction were also observed.

Conclusions: The simple interrupted suture is preferable for vascular anastomosis due to its highest patency rate. The other techniques investigated can be good alternatives because of their short anastomotic time and moderate pathological changes.

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PS238.

Endo-Microvascular Surgery in Skin Retraction Optical Cavity Model of the Rat Groin

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Objectives: Although the operating microscope is still a must for microsurgical performance, microvascular surgery could be performed, depending on the experiences and facilities, by using other visual-assisting equipment. From this point, the author tried to find less costly and more widespread equipment suitable for performing microsurgery that can, furthermore, be applied in special situations and indications, such as operating in an optical cavity.

Methods: In this experimental project, the author performed vascular microsurgical anastomoses of rat femoral vessels through the endoscopic screen monitor in a created optical cavity of a prefabricated skin retraction model in the groin area of 10 Sprague-Dawley male rats. Three skin portals were used: a central one for the endoscope and two lateral ones for the microsurgical instruments.

Results: The microsurgical anastomoses of the femoral vessels and nerves were performed easily in a reasonable time, without recorded difficulties, and with maximum physical and visual comfort for the surgeon. The author spent a mean time of 28.1, 27.3, and 19.2 minutes for the arterial, venous, and neural anastomoses, respectively. In this group of animals, 90% vascular patency and 100% accurate neural anastomoses were recorded.

Conclusions: This is a new technique of operating in the field of microvascular surgery. With its feasibilities and difficulties, it would be a point of research and application for the young generation of microsurgeons. It could be tried when minimal incisions are absolutely indicated, for